CHROMAGEN
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solar & energy solutions

Solar Power Owner's Manual

Domestic Photovoltaic Systems

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Introduction

Congratulations on the purchase of your solar electricity system. Not only are you protecting yourself from current and future price rises of electricity, you are also saving significant CO_2 emissions which helps reduce global warming and climate change.

Your system is designed to meet all Australian conditions, regulations and codes. Although it is very low maintenance, it must always be remembered that the system generates electricity and we strongly recommend that you do not attempt to service it yourself unless you are suitably qualified. Your safety is our primary concern.

Owner Maintenance

For your safety, we recommend that you do not attempt any servicing yourself unless you are suitably qualified.

The solar panels work best when clean. Regular rainfall or washing with a hose will maintain their cleanliness. If they do become excessively soiled they can be cleaned with cold water. Chromagen strongly recommend that you avoid climbing onto the roof and use the services of a qualified professional who is trained in occupational health and safety procedures.

Shading of the solar panels will affect efficiency and performance. Plant and tree growth that may cause shading at various times of the year, should be monitored and dealt with as required. Likewise, leaves, bird droppings and other debris coming to rest either on or around the solar modules should be carefully removed.

IMPORTANT: To avoid risk of injury, Chromagen strongly recommend the services of a qualified professional who is trained in occupational health and safety procedures, to clean solar electricity panels.

If you notice your system is not operating correctly, please check the ***TROUBLE SHOOTING*** chapter on page 7 and if necessary call 1300 367 565 immediately and we will help you to diagnose your problem and can arrange to send a technician to resolve it if necessary. If you need to shut down the system, please follow these steps in this order –

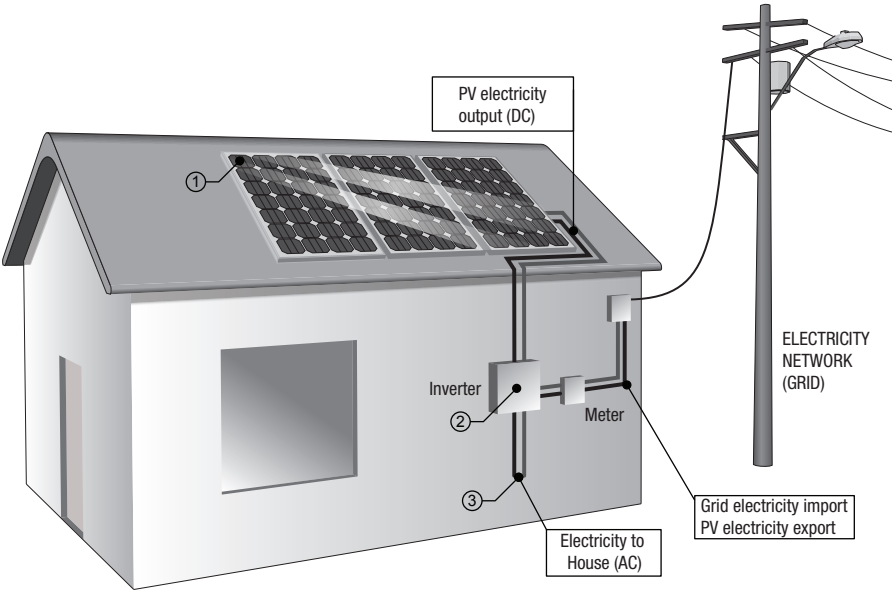
1. Switch off the ***Solar Supply Main Switch*** in the main switchboard or meter box
2. Switch off the ***AC isolator and DC isolator*** adjacent to the inverter

Following these steps will safely isolate the solar array. To switch it back on, you simply reverse the procedure.

Always remember that your system will be generating electricity during daylight hours and care should always be taken to eliminate the risk of electric shock. Refer to the ***OPERATING INSTRUCTIONS*** on page 6 for more information.

How Your Chromagen System Works

The following illustration and narrative explains how your solar electricity system works –



1. The solar electric modules are usually fitted to the roof. The number of modules will depend on the nominal size of your system and, collectively, they are known as the solar array. The solar array converts sunlight into direct current (DC) electricity.

2. The DC electricity is fed to the inverter which is normally accessible at ground level. The inverter converts the DC electricity to alternating current (AC) electricity which is compatible with the electricity supplied to your house from the grid. Most inverters have a digital readout so you can monitor information such as the amount of solar electricity produced, etc. Refer to the separate inverter owner's manual for more information.

3. Depending on local regulations, your solar system may be connected to the grid on either a net or a gross metering system. With net metering, only the electricity not first consumed by the house will be exported to the grid. With gross metering, all generated electricity is exported to the grid.

If you already have a Smart meter installed, this may need to be reprogrammed to be able to measure both your electricity imported and electricity exported. If you have an old electro - mechanical meter (with the spinning disk), this will need to be replaced with a bi-directional meter able to record the electricity you both import and export.

Your electricity retailer will read your meter quarterly and bill you for your electricity consumption. Credit will be paid for electricity exported to the grid at the rate you have negotiated with your electricity retailer. This is known as a ***feed-in tariff.***

Please note it is your responsibility to contact your electricity retailer to arrange for a feed-in tariff contract.

System Performance

During daylight hours, your system will be generating electricity at varying rates depending on the amount of sunshine. The more sunlight falling on the solar array the more electricity is generated; variable factors such as cloud cover, seasonal solar angle variations, shading or soiling of the solar array will have an effect on the electricity output. Note that you do not need to change your energy usage lifestyle to correspond with your solar system. Your energy consumption will be supplied by both solar and the grid.

The table below shows expected system performance using a 1kilowatt (1kW) PV array facing true north at a tilt angle equal to the latitude angle, without shading.
1kW nominal PV array facing True North at a tilt angle equal to Latitude, with no shading.

Location	Best Month kWh per day	Worst Month kWh per day	Annual Average kWh per day
Brisbane	4.61	3.34	4.04
Canberra	5.32	2.76	4.22
Darwin	5.11	3.54	4.47
Hobart	4.60	2.14	3.54
Sydney	4.83	2.82	3.94
Melbourne	4.59	2.22	3.58
Adelaide	5.72	2.51	4.25
Alice Springs	5.19	4.21	4.81
Perth	5.40	2.93	4.40
Cairns	4.44	3.18	3.86

System performance has been determined in accordance with AS/NZ 5033 guidelines
An average system efficiency has been used - includes PV array, wiring and inverter losses

Energy conservation

Your solar electricity system represents an investment in your future energy needs as well as a benefit to the environment. Unlike conventional generators of electricity that have been causing major environmental problems such as smog, acid rain and global warming, your solar electricity system does not produce any air or water pollution while it is generating electricity.

Considering that it generates free electricity from sunlight, it makes sense to consider the other side of the energy equation – your electricity consumption. You need not make any significant changes to your comfortable lifestyle but there are some simple things you can do to save energy and reduce your bill further –

- Install a Chromagen solar hot water system that will provide all of your hot water using a combination of free solar energy and purchased conventional energy;
- Replace other inefficient appliances, such as old refrigerators, with new high efficiency appliances;
- Replace incandescent light bulbs and downlights with energy efficient LED lighting;
- Save standby power by switching off appliances at the power point when not in use or using ESPD's - Energy Saving Power Devices;
- Switch off lights and other appliances when not needed;
- Avoid leaving computers on all day and night;
- Understand that tropical fish tanks, spa baths and pools consume large amounts of energy

Thus you will be saving money on both sides of the energy equation – on the supply side by generating your own free electricity, and on the demand side by practising sound energy conservation.

Operating instructions

Your solar electricity system is designed for automatic operation without need for user intervention. There are no moving parts or need for the owner to interact with its operation.

In the case of ***mains grid supply failure*** the inverter will immediately and automatically be disabled. This is known as ***"anti-islanding"*** and it protects linesmen from an electric shock from your system when they assume the grid is "dead". Once the grid power has been restored, the inverter will be automatically re-enabled.

If you notice your system is not operating correctly, please check the ***TROUBLE SHOOTING*** chapter on page 7 and if necessary call 1300 367 565 immediately and we will diagnose your problem and send a technician to resolve it if necessary.

Operating safety instructions

- Do not attempt to service the system unless you are ***fully qualified*** to do so. To service any electrical connection you ***MUST*** be a licensed electrician.
- All service work must be carried out in strict compliance with all local and national electrical regulations and standards.
- Review and follow all safety instructions supplied with all components of your Chromagen solar electricity system. Further information can be found at http://www.cleanenergycouncil.org.au
- Do not attempt to clean or come in contact with the surface of a solar module with broken glass. This could result in a dangerous electric shock.
- Be aware that power may be present at any point in electrical circuits despite the opening of circuit breakers or isolators.
- Circuit breakers can trip automatically if problems occur. If the circuit breaker is switched back to the closed or "on" position and it immediately trips back to the open or "off" position there is a problem.
- Do not substitute materials supplied with the Chromagen solar electricity system.
- Appropriate precautions must be taken when working on rooftops or at heights in accordance with local and national occupational health and safety regulations.

IMPORTANT NOTE:
Disclaimer of liability: Despite the instructions and recommendations provided in this manual, the actual use and maintenance of the solar electric system is beyond the control of Chromagen Pty Ltd. Therefore, Chromagen Pty Ltd does not assume any responsibility and expressly disclaims liability for loss, damage or expense associated in any way with the installation, use, or maintenance of the solar electric system.

Trouble Shooting

The inverter displays LED lights and/or screen displays to monitor the normal operation and fault conditions of the system. The occurrence of a problem within the system will usually be indicated by the inverter. The inverter user manual contains a trouble shooting chapter which will explain these lights and displays.

Please read the trouble shooting chapter carefully and then precisely follow the instructions given. If these fail, please call ***1300 367 565*** immediately and we can assist to locate a qualified technician to resolve your problem.

IMPORTANT REMINDER

Please keep this owner's manual in a safe and easily locatable place ***together with all other documentation supplied with your system.***

Warranty

In the case of a service being required, please make available all the documentation to the service technician. Note that the manufacturers' warranties may be voided if the system is serviced or interfered with by an unqualified person.
Your solar electric system comes with the following warranties:

Solar electric modules
Refer to the warranty information contained in the documentation supplied with your solar electric modules. Solar PV modules have a 25-year limited warranty. This means they are guaranteed to perform to 90% capacity for 15 years and 80% for the remaining 10 years. The module warranty is provided by the manufacturer of the modules.

Inverter
Refer to the warranty information contained in the documentation supplied with the inverter. An inverter warranty is usually 5 years but an optional additional 5 years can often be bought. The inverter warranty is provided by the manufacturer of the inverter.

Roof mounting frames
10 years from the date of installation. The warranty of the mounting frame and its components is provided by the manufacturer of the components.

Installation
One year from the date of installation. The installation warranty is provided by the accredited installer, the details of whom can be found on page 9 of this manual.

Documentation Supplied- in accordance with
AS/NZS5033 (2011)

1.	Solar module user manual and warranty	☐
2.	Inverter user manual and warranty	☐
3.	Rail mounting kit user manual and warranty	☐
4.	Inverter operation	☐
5.	A list of all equipment supplied	☐
6.	A list of alarms	☐
7.	Action on alarms being activated	☐
8.	Shutdown and isolation procedure	☐
9.	Circuit diagram including electrical ratings	☐
10.	Minimum and maximum design temperatures	☐
11.	Commissioning and installation checklist	☐
12.	Array frame engineering certificate	☐

Accredited Installer Details ***(to be completed by accredited installer)***
As an accredited designer / installer of the PV systems I,

Name of accredited installer — Accreditation No.

Address of accredited installer

declare that this installation has been performed in accordance with all relevant standards in force at this date.

Contact phone numbers

Signature of accredited installer

Date of installation and commissioning

Expected System Performance

(to be completed by accredited installer)

1.	Size of solar array in kilowatts		kW
2.	Maximum AC output of inverter in kilowatts		kW
3.	Azimuth angle	Expected loss	%
4.	Elevation angle	Expected loss	%
5.	Shading of solar array	Expected loss	%
6.	Expected average daily output of solar array in kilowatt hours		kWh
7.	Location of inverter		
8.	Location of PV array/s		

Actual System Performance

(to be completed by owner)

Date of connection to the grid		
E-Total reading on inverter at end of year 1	Daily average	kWh
E-Total reading on inverter at end of year 2	Daily average	kWh
E-Total reading on inverter at end of year 3	Daily average	kWh

Maintenance and Fault Log

Please do not climb above 2 metres to maintain solar modules without observing all OH&S regulations. Use only clean water to clean solar modules, no detergents or solvents.

Date	Problem	Remedy	Electrician

Inverter Details

Make	
Model	Size

Array Details

Module type		Model	
SN:		SN:	
SN:		SN:	
SN:		SN:	
SN:		SN:	
SN:		SN:	
SN:		SN:	
SN:		SN:	
SN:		SN:	
SN:		SN:	
SN:		SN:	
SN:		SN:	
SN:		SN:	
SN:		SN:	
VOC ARRAY 1	VDC	VOC ARRAY 2	VDC
VMP ARRAY 1	VDC	VMP ARRAY 2	VDC

Maintenance Schedule for PV Installs

Site	Type of maintenance required for PV array systems.	Suggested frequency	Comments/ remarks	Date
PV array	House-keeping of the array, Remove any debris built up near and under the PV array system.	As required		
Shading issues if any?	Prune or remove any foliage that may shade array	As required		
Visual defects including of the PV array.	Every 3 months	3 Months		
Inspection of junction boxes.	Tightness of connections integrity of seals and cable entrances, conduits sealing.	1 year		
Wiring of the installation	Check all electrical connections for water ingress	1 year		
Electrical characteristics	Measure open circuit voltage and short circuit currents	1 year		
Protective Devices	Verify operation of all DC and AC CB and RCDs and even solar array isolators.	1 year		
Mounting structures	Verify integrity of the entire PV array.	1 year		

NOTES:

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